

REMARKS

This Amendment is filed in response to the Office Action dated July 9, 2009. For the following reasons this application should be allowed and the case passed to issue. No new matter is introduced by this Amendment. The amendment to claim 1 is supported by originally filed claim 2. Support for the amendment to claim 5 is found in the specification on page 7, lines 5-7. The specification at page 7, lines 15-17 provide support for the amendment to claim 7. Claims 3 and 4 are amended to maintain proper dependency.

Claims 1 and 3-15 are pending in this application. Claims 8-15 were withdrawn pursuant to a restriction requirement. Claims 1-7 were rejected. Claims 1, 3-5, and 7 are amended in this response. Claim 2 is canceled in this response.

Claim Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 5, and 7 were rejected under 35 U.S.C. § 102(e) as being anticipated by Delzeit (US 6,858,197) as evidenced by the dictionary.com definition of “wavelike.”

Claims 1-5 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Delzeit.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Delzeit in view of Fan et al.

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

Delzeit does not anticipate or render obvious the claimed catalyst structure because Delzeit does not disclose or suggest the catalyst structure is a columnar body with its upper surface serving as the crystal growth surface, the catalyst structure including a catalytic material

that forms a ring or a whirl on a crystal growth surface, and at least part of a side of the columnar body has a non-catalytic material with substantially no catalytic activity with respect to a growth of the crystalline carbon, as required by claim 1.

In the present invention, a catalyst structure is a columnar body with its upper surface serving as a crystal growth surface, where at least a part of the side of the columnar body has a non-catalytic material that has substantially no catalytic activity with respect to the growth of crystalline carbon, such that the non-catalytic material prevents the crystalline carbon from being spread in direction of the crystal growth surface during crystal growth, which allows crystals to be grown in a controlled direction, thereby enabling the formation of a carbon nanotube with a more homogenous geometry (Specification at page 6, lines 8 to 15).

The Examiner alleged Delzeit, “teaches that the structure can be patterned in the shape of the number “8” which is a columnar body with a ring” (Office Action, page 4). While Delzeit teaches the number “8,” Delzeit does not disclose or suggest a columnar body with its upper surface serving as the crystal growth surface, the catalyst structure including a catalytic material that forms a ring or a whirl on a crystal growth surface, and at least part of a side of the columnar body has a non-catalytic material with substantially no catalytic activity, as required by claim 8. Thus, Delzeit does not teach or suggest the claimed columnar body.

Further, Delzeit discloses, “[t]he catalyst(s) is preferably provided using ion beam sputtering, arch discharge, laser ablation, or evaporation” (col. 4:34-36). These techniques are thin-film formation techniques that are not suitable for forming a columnar body.

The Examiner maintained that it would have been obvious to create a multilayer molybdenum catalyst layer with a silver non-catalytic layer on top in the shape of a columnar ring. The Examiner interpreted wavelike as meaning an outward curve, or one of a series of

curves, in a surface or line, or undulation. Thus, the Examiner concluded that Delzeit teaches the claimed wavelike ring configuration.

The Examiner acknowledged that Delzeit does not teach oxidizing the surface of the nanotube catalyst. The Examiner averred that Fan et al. disclose depositing iron as a catalyst and then oxidizing the iron surface.

As explained above, Delzeit does not suggest the claimed catalyst structure. Fan et al. do not cure the deficiencies of Delzeit.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). There is no suggestion in Delzeit or Fan et al. to modify the catalyst structure of Delzeit to obtain a catalyst structure that is a columnar body with its upper surface serving as the crystal growth surface, the catalyst structure including a catalytic material that forms a ring or a whirl on a crystal growth surface, and at least part of a side of the columnar body has a non-catalytic material with substantially no catalytic activity with respect to a growth of the crystalline carbon, as required by claim 1.

The only teaching of the claimed catalyst structure is disclosed in Applicant's specification. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The dependent claims are allowable for at least the same reasons as claim 1, and further distinguish the claimed catalyst structure. For example, claim 5 further requires the crystal growth surface has a multilayer structure with catalytic and non-catalytic material. Claim 7 further requires the crystal growth surface has a wavelike non-catalytic material and a catalytic material surrounding the non-catalytic material. The cited references do not suggest catalyst structures with these additional limitations.

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Bernard P. Codd
Registration No. 46,429

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 BPC:MWE
Facsimile: 202.756.8087
Date: October 9, 2009

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